Natural Heritage & Endangered Species Program
Massachusetts Division of Fisheries & Wildlife
Route 135, Westborough, MA 01581
tel: (508) 792-7270, ext. 200; fax: (508) 792-7821
www.state.ma.us/dfwele/dfw/nhesp

Incurvate Emerald Dragonfly

Somatochlora incurvata

State Status: **Threatened**
Federal Status: None

DESCRIPTION OF ADULT: The Incurvate Emerald (*Somatochlora incurvata*) is a large, slender insect of the order Odonata, suborder Anisoptera (the dragonflies), family Corduliidae (the emeralds). Most emeralds of the genus *Somatochlora* are large and dark with at least some iridescent green coloration, brilliant green eyes in the mature adults (brown in young individuals), and moderate pubescence (hairiness), especially on the thorax. The shape of the reproductive structures (the terminal appendages in the males and the vulvar lamellae in the females) are the most reliable way to identify the species within *Somatochlora* (Needham *et al.* 2000). Incurvate Emeralds have two indistinct yellowish ovals (which fade with age), the front one more elongate, on each side of the thorax. The thorax overall is of a bronzy brown color with metallic green highlights throughout and long pale hairs. The face is very dark overall, with a bright yellow "upper lip". The large eyes, which meet at a seam on the top of the head, are brilliant green in mature adults. The long and slender abdomen, black with a dull metallic green luster, is most narrow at the base, with a yellow lateral spot on segment 2, a pale basal ring on segment 3, and dull yellowish lateral spots on segments 4-8 and (dragonflies and damselflies have 10 abdominal segments). The wings of this species are transparent and, as in all dragonflies and damselflies, are supported by a dense system of dark veins.

Adult Incurvate Emeralds range from 1.9 to 2.3 inches (49 to 59 mm) in length. Females are stockier than males and have a pale yellow ovipositor.

SIMILAR SPECIES: Incurvate Emeralds are distinguished from other species of the genus *Somatochlora* in Massachusetts by the thoracic markings and by the shape of the terminal appendages (part of the reproductive structures). The shape of the males terminal abdominal appendages (as shown in Walker and Corbet (1975), Needham *et al.* (2000), and Nikula *et al.* 2003)) and the females large triangle-shaped vulvar lamina (as shown in Walker and Corbet (1975) and Needham *et al.* (2000)) are the best way to definitively determine this and many species of dragonflies. A magnifying lens or microscope is needed to observe characters of these structures.

The nymphs can be distinguished by characteristics of the tibia and femora and by the size and shape of the lateral spines on the abdomen as per the keys in Needham *et al.* (2000) and Soltesz (1996).

HABITAT: The Incurvate Emerald inhabits sphagnum bogs.

LIFE-HISTORY/BEHAVIOR: This species flies from early July through early September.

Although little has been published about the life cycle of the Incurvate Emerald in particular, information documented for other species is most likely applicable. Like damselflies, dragonflies have two distinct life stages: an aquatic larval stage (nymph) and in the flying adult.

INCURVATE EMERALD FLIGHT PERIOD

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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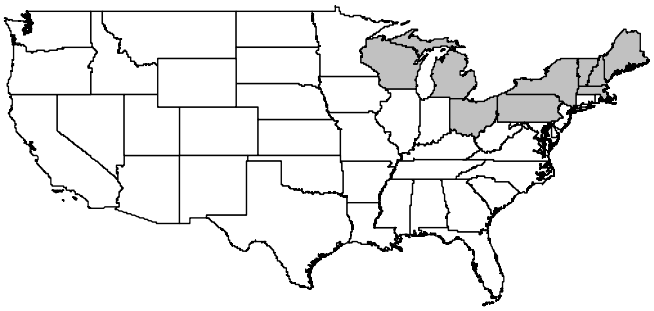
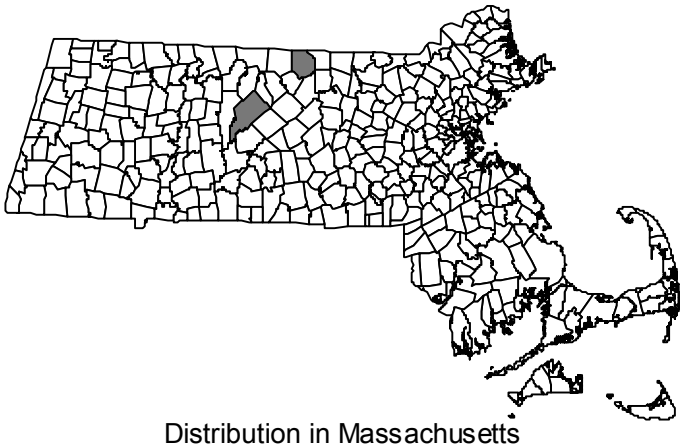
Dragonfly nymphs are voracious predators, feeding on just about any animal of appropriate size, including a wide variety of aquatic insects, small fish, and tadpoles. Nymphs undergo several molts until the final stage of development, the emergence from the nymph to adult stage. The nymph of the Incurvate Emerald crawls up onto emergent vegetation, exposed banks or tree trunks when it is ready to transform to the adult stage. When the nymph reaches a secure substrate, the adult begins to push itself out of the larval exoskeleton, head and thorax first and then the abdomen. Immediately following emergence the adult is very compacted, especially the wings and abdomen. As soon as the abdomen and wings are fully expanded, the adult takes its first flight. This maiden flight usually carries the individual up into surrounding forest or other areas away from water, where they spend several days maturing and feeding. Incurvate Emeralds can be found in fields and forest clearings, which they patrol in search of small aerial insects, such as flies and mosquitoes, on which they feed. When not feeding, Incurvate Emeralds rest hanging vertically from the branches of bushes and trees. The adult coloration is acquired and the dragonfly becomes sexually mature before returning to the breeding habitat to initiate mating. Breeding in Massachusetts probably occurs into September. Males patrol over bogs and wet depressions, usually no more than two feet above the surface of the water, in search of females. The joined pair quickly flies off into the surrounding upland habitat to mate.

Following mating, oviposition (egg laying) occurs. Females of the genus *Somatochlora* oviposit alone and deposit their eggs directly into the water by tapping the tip of the abdomen on its surface. Incurvate Emerald females oviposit in open pools and wet depressions in the bog.

RANGE: The Incurvate Emerald inhabits a narrow band along the southeastern Canadian border into the northeastern United States including the states of Maine, Massachusetts, Michigan, New York, Ohio, Pennsylvania, and Wisconsin.



Range of Species in US



Distribution in Massachusetts
1977 - 2002
Based on records in Natural Heritage Database

POPULATION STATUS IN MASSACHUSETTS: The Incurvate Emerald is listed as a Threatened species in Massachusetts and is known from just three sites. As with all species listed in Massachusetts, individuals of the species are protected from take (picking, collecting, killing,etc…) and sale under the Massachusetts Endangered Species Act.

MANAGEMENT RECOMMENDATIONS: As for many rare species, exact needs for management of the Incurvate Emerald are not known. As an inhabitant of bogs, Incurvate Emerald is vulnerable to habitat alteration such as infilling and damming, along with many other aquatic impacts such as chemical pollution and salt run-off from roadways. Another important part of preserving this and other species of dragonflies is the maintenance of suitable upland habitat essential for the life cycle of Incurvate Emerald and other dragonflies. Dragonflies need natural uplands in which to mature and feed before returning to wetlands to breed.

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